FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

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Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

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Aug. 6–20 French Gliding Competition at Clermont-Ferrand
Aug. 7 .... Aerial Derby Starting at Waddon
Aug. 12 .... Schneider Cup Seaplane Race, at Naples
Sept. 2–17.... International Concours Aviatique, Rotterdam
Sept. 9–10.... 1,000 Miles Race round Britain for the King's Trophy
Sept. .... Tyrrhenian Cup, Italy
Sept. .... Italian Grand Prix
Sept. or Oct. R.Ae.C. Race Meeting, at Waddon
Sept. 22 .... Coupe Deutsch (300 kil.)
Dec. 15–Jan. 2 Paris Aero Exhibition

1923.

Dec. 1 .... Entries Close for French Aero Engine Competition

1924.

Mar. 1 .... French Aero Engine Competition.
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The Index for Vol. XIII of FLIGHT (January to December, 1921) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 1s. per copy (1s. 1d. post free).

EDITORIAL COMMENT.

FROM the Prime Minister's statement in the House on July 17, it appears that the Committee of Imperial Defence has arrived at the decision that, in view of the need for economy, no money should be expended in developing an airship service, "either for commercial purposes or with the object of establishing Imperial communications." That seems to dispose of any doubt as to whether or not the Government is to take any part in getting the airship service to India going by guaranteeing a certain interest on the capital involved. So far so good. Now we know, at any rate, how we stand. We need expect nothing from the Government. It still remains to be seen whether the Admiralty, whose Parliamentary Secretary, Mr. Amery, is the chairman of the new Sub-Committee to look into the technical aspects of the Burney scheme, will decide to jog along without a couple of destroyers so as to be in a position to afford airships. Even if it is decided to come down in favour of airships—and that is, of course, by no means certain—it is to be expected that whatever is done with them will be mainly with naval ends in view. With that we are not inclined to quarrel. We have previously stated as our conviction that in the matter of airships we see little objection to the Admiralty taking control. The construction of the ships themselves, the training of the personnel, and the naval use of airships appear to follow so closely along naval lines that it seems fairly obvious that the natural procedure would be to give the Admiralty control, now that their lordships have, almost, decided that they do want airships, after all.

Committee of Imperial Defence and Airship Scheme

We should like to see the Burney scheme go through, because we believe that there is a very definite useful commercial future for airships. The main point, however, is that we want airships. We must have airships. And if we cannot have them any other way than as part and parcel of the Navy, then that method will have to satisfy. At any rate, designing and construction, not to mention the more important phase of the maintenance of an airship personnel, should be assured, and not, as the Secretary

of State suggested, put on the shelf for the next ten years, to be resumed when, with little doubt, everybody else will have got well ahead of us in airship matters.

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Aircraft v. Warships

As we anticipated, considerable secrecy is being, not unnaturally, maintained, both by the Air Ministry and the Admiralty, regarding the results, if any, of the attacking experiments with aircraft on warships, which took place in the Channel on July 7. While we fully realise that a certain amount of reserve is necessary in giving to the public and world at large detailed information that might be of value to a potential enemy, we do think that the broad results should be made known. After the American experiments last year a great deal was published regarding results of bombing tests, and though it is true that a confidential U.S. report upon the results still remains to be revealed, there really does not appear to be any valid reason for withholding from the public the main facts established by our tests.

From meagre results that have been reported, assuming them to be approximately correct, it appears that during the mock attack by aircraft on the Fleet a squadron of aircraft suddenly appeared, and the Fleet altered course so as to prepare for defence against it. The flight, however, instead of attacking, circled around the Fleet, leaving a dense smoke screen, which prevented the Fleet from seeing what was coming. Then the real attack came from, it is stated, a totally different quarter, and torpedo planes dodged through the smoke screens, dropped their torpedoes and got away. It is stated that many hits were thus recorded which would have had serious consequences had the torpedoes been loaded with explosives instead of oil. It is even asserted that the whole thing was over in 1½ minutes.

While we have no means of judging of the accuracy of this report, there does not appear to be anything in it which gives cause for doubting that, in fact, something very like that did, or at least could, occur. The establishment of a smoke screen by aircraft has long been within the bounds of practical politics, and the sudden attack by torpedo-planes, darting through the smoke screen and getting away again after having dropped their charges, does not sound at all unlikely to anyone with a knowledge of modern aircraft.

It may be objected that, even accepting the truth of this report, the Navy was handicapped by having no aircraft for defence. While that is a perfectly fair claim, it should not be forgotten that whereas this attack was—must have been—delivered by a mere handful of machines, in real warfare that handful would be squadron after squadron, arriving at carefully timed intervals and from all sides, and unless the Fleet was protected by huge numbers of aircraft serious losses would inevitably have been sustained. We are distinctly not among those who think that the time is ripe for scrapping the Navy and trusting entirely to the air, but we do think that no navy in the world can afford not to make the fullest use of aircraft co-operation. That ultimately the Navy will dwindle in size, and the R.A.F. grow, is not to be doubted. What the Navy has to do, if it wishes to retain its existence for another decade or so, is to gracefully postpone the evil day of its demise by making every possible use of co-operating aircraft. Personally we are of the opinion that one of the results of the experiments will be that the Navy will devote some of the money intended for other purposes to forcing forward a better equipment of aircraft, and in so doing it will probably make another fight for a separate Naval Air Service—a retrograde step which will require careful watching.

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British Entry for the Schneider Cup

Since the memorable occasion when, in 1914, Howard Pixton won the race for the Schneider Cup at Monaco, Great Britain has not played a very glorious rôle in this classic contest. In 1919, as a result of Pixton's win on the Sopwith seaplane, the race was held at Bournemouth, but misty weather prevented all of the competitors, except Signor Janello, from completing the course. The memory of the controversy as to whether or not the Savoia pilot had correctly rounded the mark boats will still be fresh in mind, and it is sufficient to say that it was decided to let the Italian Aero Club organise the next race. Since then Great Britain has entered no competitor for the Schneider race, and the Italians having won it two years running, the Cup will become their property in perpetuity, should they succeed in winning again this year.

Realising this, it is gratifying to learn that, at any rate, one British competitor will represent this country for the Schneider race to be held at Naples on August 12. The machine chosen is a Supermarine flying boat with Napier "Lion" engine. So far as we understand, this Supermarine is an adaptation of the single-seater "Sea King," Mark II, which was fully illustrated and described in our issue of April 20, 1922. The "Sea King" then had a 300-h.p. Hispano-Suiza engine, but for the race a Napier "Lion" will be fitted. Also, in its original form, the "Sea King" had amphibian gear, which will not be required for the Schneider race.

As the original machine had a speed of about 125 m.p.h., the racer should be very much faster, what with the extra power and the absence of the amphibian gear. What that increase will be we cannot say, but, at any rate, the 150 m.p.h. mark should be reached without great difficulty.

We do not know whether any name has been chosen for the Supermarine Schneider racer, but we would suggest that a very fitting name would be "Sea Lion," Mark II. It will be remembered that the Supermarine entered for the Schneider race at Bournemouth and, flown by Hobbs, was called the "Sea Lion." As this machine is also fitted with that famous engine, and is flying in the Schneider race, the name might well be retained.

The pilot who will fly the machine in the race is Mr. H. C. Biard, who has had a very extensive experience of flying-boat work and has been test pilot for the Supermarine Aviation Works for some time. Thus the combination of Supermarine boat, of known and proved sea and air worthiness, Napier "Lion" of enviable reputation and pilot with long experience, should be one difficult to beat. We are prepared to find that faster machines may be entered by other nations, but we shall be surprised if any of them can combine speed with as good seaworthiness as the "Sea Lion." May our representative bring the Cup back to these shores.

FLIGHT
THE AIRCRAFT ENGINEER AND AIRSHIP

THE ARMSTRONG-SIDDELEY "JAGUAR" RADIAL AERO ENGINE

An Interesting Air-Cooled Engine of 350 H.P.

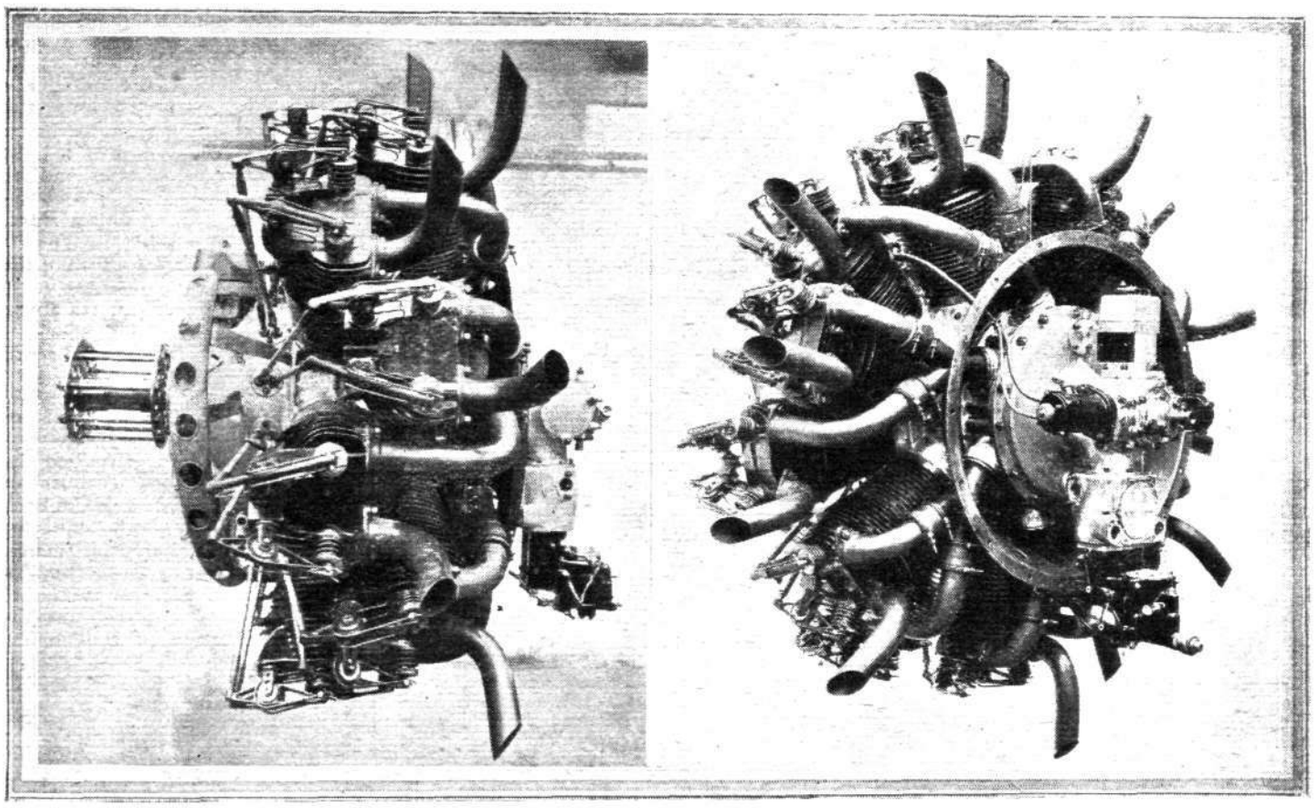
As briefly announced in FLIGHT last week, the new Armstrong-Siddeley radial air-cooled, the "Jaguar," has recently passed its type tests with flying colours. This engine, which has been undergoing development for a considerable time, is chiefly remarkable for the following desirable features :—The great number of cylinders results in very even torque and smooth running; the petrol and oil consumption is low, and finally the weight is but slightly in excess of 2 lbs. per horse-power. In addition, the short overall length results in a small longitudinal moment of inertia, which is of considerable importance in a machine which has to be manœuvred quickly, for instance during an air fight. The type-test recently passed by the "Jaguar" is the latest and somewhat severe Air Ministry test and includes five non-stop runs of 10 hours each. That the engine has successfully fulfilled the conditions is proof of its reliability, and it is not, therefore, without interest to examine the details of the design which have made the good results possible.

Fundamentally the Siddeley "Jaguar" is a radial air-cooled engine with its 14 cylinders disposed in two rows, those of the back row being placed in line with the spaces between the cylinders of the front row. From this arrangement it follows that the crankshaft is of the two-throw type with seven connecting rods meeting on each crank-pin. As will be seen from the illustration showing the connecting rod assembly, there is a master connecting rod and six auxiliary rods. The master rod is of H section, while the six auxiliary rods are tubes of circular section. All rods are made of high tensile steel, and are machined all over so as to ensure their weight, and consequently balance, being accurate. The webbed master ring is made in two dissimilar parts held together by four bolts, and the white-metal crank-pin bearing is cast direct into the master ring. The latter is controlled by the master rod, to which it is secured by two pins passing through the webs. The wrist-pins of the auxiliary rods work on similar tubular pins, which are floating in bronze bushes held in the webs of the master ring. The pins are held in position endwise by wire spring clips which, when pinched up, are inserted into the phosphor bronze bushes and allowed to expand there into annular grooves. In the photograph the free ends of these locking wire clips can be seen.

The tubular gudgeon-pins are similar to the wrist-pins, except that they are of larger diameter, and are entirely floating, that is to say, they are free to turn in the piston bosses and also in the phosphor bronze bushes, which are in turn floating in the small-end of the connecting rods. The small-end bronze bushes are perforated with holes which ensure the lubrication of the working surfaces, the oil supply being maintained through large holes at the top of the small-end of the connecting rods.

Pistons

The pistons are made of a special aluminium alloy, combining the requisite strength of material with adequate heat-conducting properties. They are furnished with two gas rings of cast iron at the head, and with two scraper rings of the same material, one immediately below the gas rings, and the other in the skirt to prevent any excess of oil on the cylinder walls from finding its way into the combustion chamber. For the purpose of enhancing this effect two chamfered grooves are turned in the piston, immediately below each scraper ring, and the oil which collects in the grooves escapes into the inside of the piston through a series of small holes in the bottom of the groove.



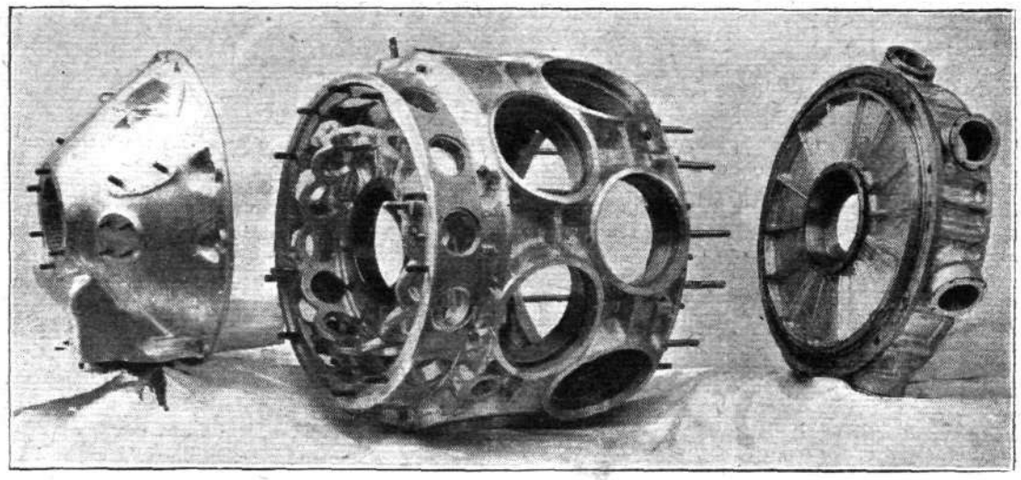
THE ARMSTRONG-SIDDELEY "JAGUAR": Side and three-quarter rear views.

Crankshaft

As already mentioned, the crankshaft, which is in one piece and very rigid, is of the two-throw type, with the pins at 180°. Bronze balance weights, shaped like a sector of a circle, serve to neutralise the couple set up by the two pins at 180°. The crankshaft is carried in three journal roller bearings, and is located by a double-acting ball thrust bearing at its front end. The rear end of the crankshaft carries the induction fan. The drives for the cams, ignition gear, and oil pumps are all taken off the front end of the crankshaft.

The Crank-case

The crank-case proper is of aluminium, and is in one piece, although what might be termed the engine "body" consists of three parts. The crank-case itself carries the cylinders, tappet guides, and bolts for securing the engine to its bearer plate. The front cover carries the crankshaft front journal and thrust bearings and the auxiliary drives for pumps, cams



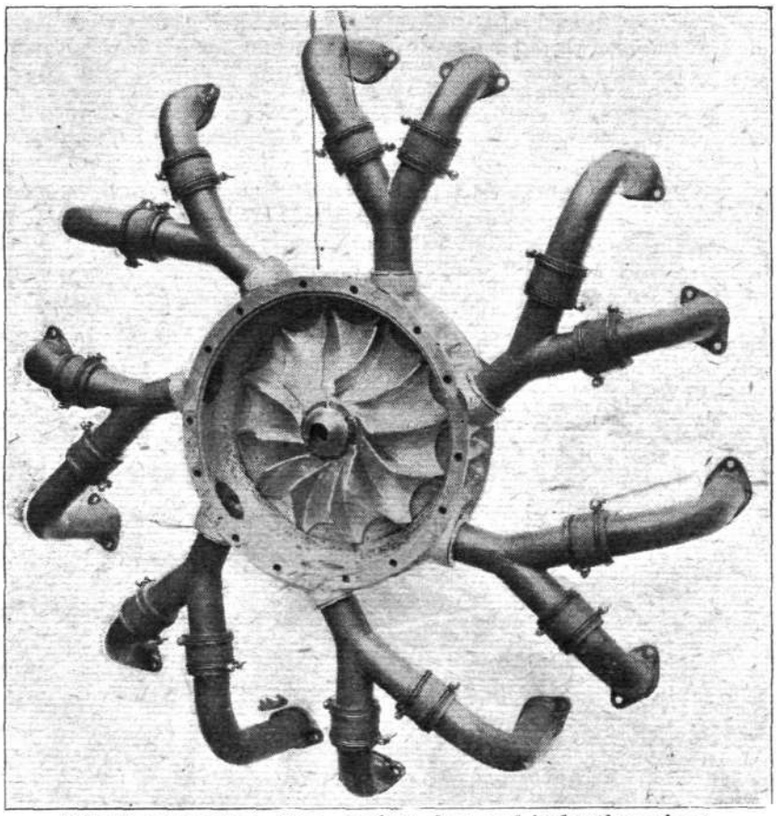
The Armstrong-Siddeley "Jaguar": Crank case with front cover and rear cover and fan casing.

and ignition, while the back cover carries the crankshaft rear bearing and forms the induction fan casing. One of our photographs shows the three parts.

Cylinder Construction

The cylinders of the "Jaguar" are of composite construction, having heads of aluminium and barrels of steel. The aluminium head is a casting, and the fins are so arranged that they leave a space between the valve stem guides on top of the cylinder head. Internally the head shows a hemispherical shape, which should give a good shape of combustion chamber, and the valve seats are of a special bronze alloy. The cylinder barrel is turned and bored from a steel forging, and is shrunk-screwed into the aluminium head, being locked in position there by a lock nut, shaped as a cooling fin. The end of the cylinder barrel butts up against a shoulder in the aluminium head so as to form a gas-tight joint.

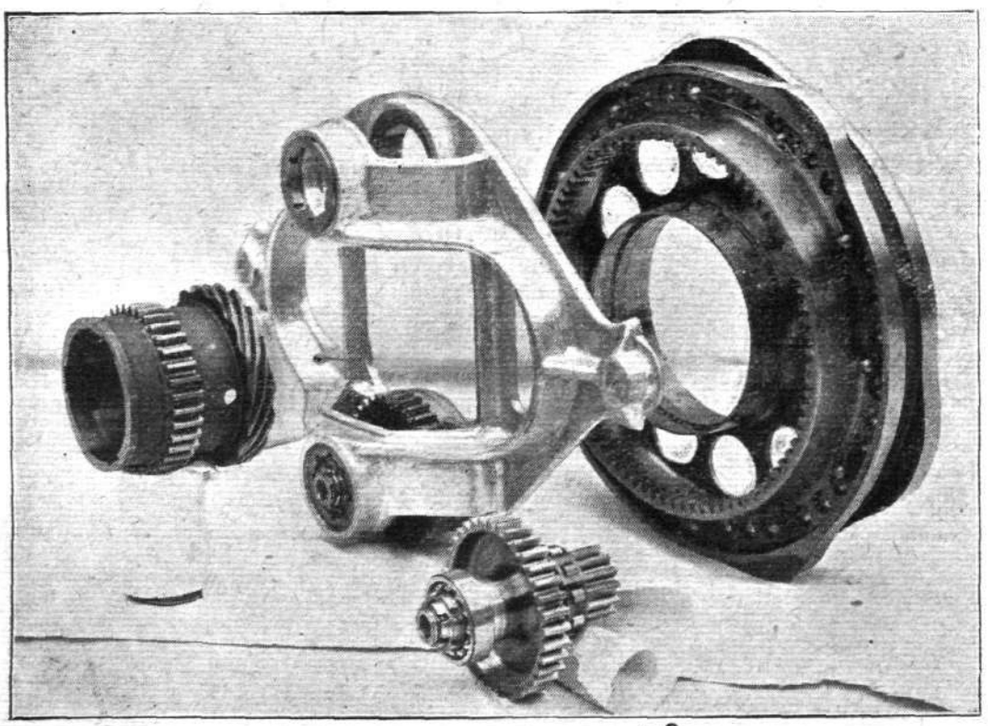
The cylinders are mounted on the crank-case by being screwed into a light steel adapter, and are secured by double-coned locking rings. The cylinder is screwed into the sleeve until the valve gear and ports are in line, and the locking ring is then tightened up.



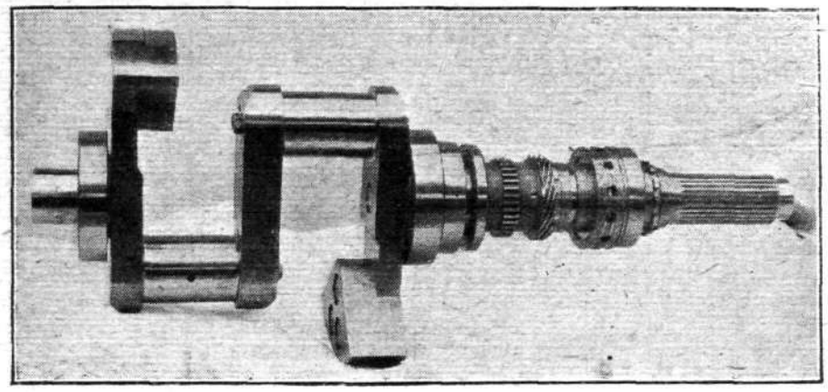
The "Jaguar": Fan casing, fan and induction pipes.

Induction System

The explosive mixture is supplied by a dual carburettor mounted on the back cover, and delivering through the centre of an induction fan or blower mounted in a casing on the back of the engine.



The "Jaguar" Engine: Cam rings and epicyclic cam gear.



Crankshaft of Armstrong-Siddeley "Jaguar."

The air intake to the carburettor is under the control of the pilot, and may be taken either from the vicinity of the lower cylinder heads or from the slip stream outside the aeroplane fairing. Thus the incoming air may have its temperature regulated to suit atmospheric conditions. The carburettor is heated by an exhaust gas heater box, so that vaporisation of the fuel is started as soon as it leaves the carburettor.

The fan or blower is of the centrifugal type, and is mounted on the rear of the crankshaft and driven at crankshaft speed. Thus the petrol and air are thoroughly mixed, while it is claimed that an even distribution is obtained. At high speeds it would appear that a certain amount of forced induction may be obtained.

The front of the fan chamber forms the rear wall of the crank-case, so that the fan chamber is heated by the oil in the engine body. The rear cover of the fan chamber is similarly heated by a jacket through which hot oil from the engine is passed on its way from the scavenge pump to the oil tank. Seven pipes convey the gas from the fan chamber to the cylinders, each pipe being forked so as to serve one front and one rear cylinder.

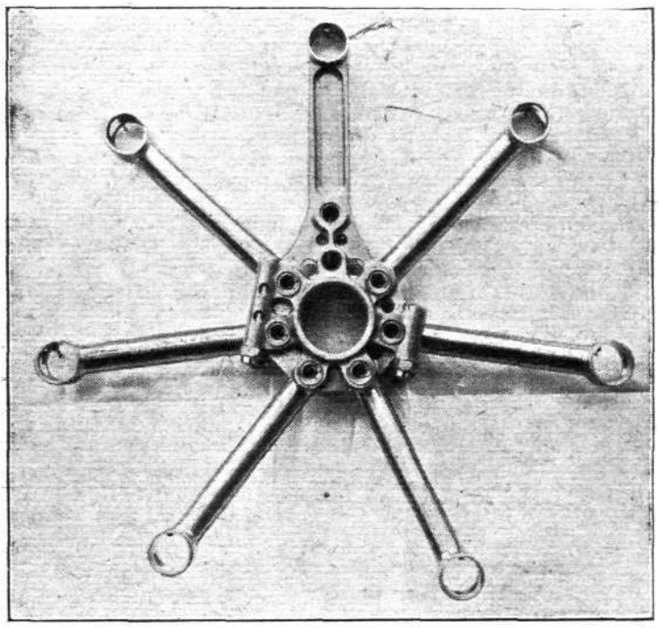
The Valve Gear

In these days of multi-valve cylinders it is somewhat surprising to find that the "Jaguar" has only two valves per cylinder. On the other hand, each valve is of fairly large diameter, and the valve gear is certainly simpler with only two valves. It might be mentioned incidentally that all valves with their springs and spring washers are similar and interchangeable. The valve spring collar is retained by a split steel cone, which is screwed (left-hand thread) on to the valve stem. The valve spring, by pressing the collar against the cone, pinches the latter into the screw threads on the valve stem and so locks it.

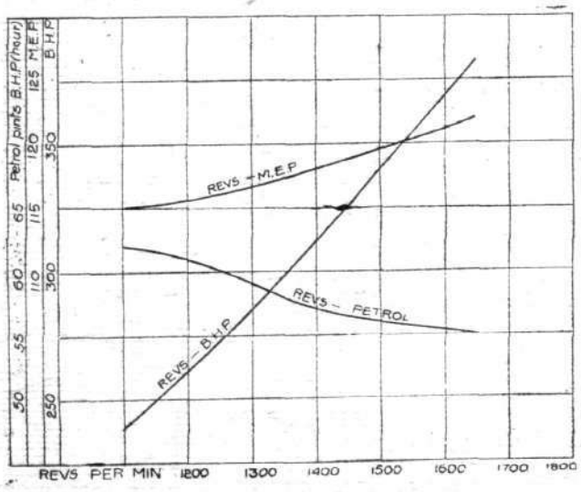
The valves are operated *via* push rods and rockers by two cam rings mounted on the front of the engine. One ring has three cams for the inlet valves and the other has three exhaust cams. The cam rings are driven from the front end of the crankshaft through epicyclic gearing, and rotate together at one-sixth engine speed, and in opposite direction to the crankshaft.

Lubrication

The "Jaguar" is provided with a somewhat unusual, and very positive, lubrication system. Two pumps, "feed" and "scavenger," of the gear type are fitted, and as the scavenger pump is of about 30 per cent. greater capacity than the feed pump, the base is at all times positively drained. Oil is drawn from the tank and forced by the feed pump through a filter to the hollow crankshaft, at the rate of approximately 2½ gallons per minute. The filter gauze is carried on a movable lantern, which is held in position by a spring. This lantern is so arranged that, in case the gauze gets choked it moves back against its spring, and so allows unfiltered oil to reach the crankshaft. The whole filter may be readily dismantled for cleaning.



THE "JAGUAR": Connecting rod assembly.

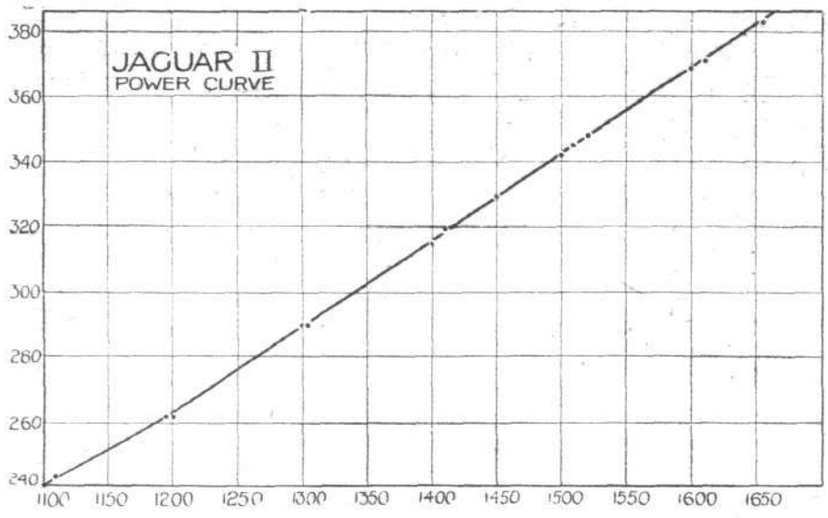


Running chart of the Armstrong-Siddeley "Jaguar."

The following table gives a brief summary of the test runs recently undertaken:—

Summary of Tests

Date.	Test.	Time Run. Hrs.	Mins.	B.H.P.	B.H.P. Corr.	Fuel (pts. per B.H.P./hr.	Oil (pts. per B.H.P./hr.
17.6.22	Power Curve	0	40	—	—	—	—
,,	Endurance	9	55	234·6	—	—	0·0192
,,	,,	0	5	330·2	331·4	0·599	—
18.6.22	,,	9	55	294·1	—	—	0·218
,,	,,	0	5	329·7	330·3	0·605	—
19.6.22	,,	9	55	293·6	—	—	0·0239
,,	,,	0	5	326·0	326·0	0·599	—
20.6.22	,,	9	55	293·9	—	—	0·0204
,,	,,	0	5	—	330	0·593	—
,,	,,	9	0	292·8	—	0·591	0·0197
21.6.22	,,	0	55	—	—	—	0·0184
,,	,,	0	5	—	342·2	—	
,,	Slow run	0	30	737 r.p.m.	—	—	—
	Acceleration	0	3	—	—	—	—
21.6.22	High Speed	1	0	1,751 r.p.m.	267	0·626	—
	Acceleration	0	2	Five each under 4 seconds.			
21.6.22	High Power	1	0	1,648 r.p.m.	373·5	0·557	—
	Power Curve	0	40	—	—	—	—



Power curve of the Armstrong-Siddeley "Jaguar" aero engine.

The oil entering the crankshaft flows, through passages drilled in the webs, to the crank-pins, where it enters the bearing at the centre, and, after lubricating and cooling the bearing, leaves by holes drilled at each end of the pin, and returns, through similar passages, to the front cover, where it keeps the cams and cam gear thoroughly flooded. The end clearance between the crank-pin bearing and the webs is carefully set to regulate the amount of oil which is thrown off from the crank-pins to lubricate other internal working parts.

All the oil released inside the engine drains to a sump from which it is returned to the tank by the scavenge pump. The oil-pressure gauge is connected to the system on the engine side of the filter, so that the gauge shows the pressure of oil entering the crankshaft, and not the pressure which is being used to force oil through a partly clogged filter. An oil-pressure release valve is fitted to prevent strain on the gauzes and piping through the high oil pressures developed on starting with cold oil. This release valve is set to blow off at approximately 50 lbs./sq. in., and this setting should not, of course, be altered by the users.

Ignition

It is of interest to note that in the "Jaguar" magneto ignition has been done away with, the ignition being by battery and coils. A dynamo driven by the engine charges a small accumulator, and a switchboard complete with cut-out is supplied.

Mounting

A mounting plate of unusual design is employed, and forms a standard part of the "Jaguar" engine. This is a steel pressing shaped like a deep dish, and finishing in a flange in which are 16 holes on a 25-in. pitch circle. The front of this "dish" is bolted to the engine, and its rear flange, with the 16 holes, is carried aft clear of the engine, thus enabling a simple engine plate to be used on the aeroplane.

A few leading Particulars

Without going into a detailed specification the following main particulars of the "Jaguar" may be of interest. The bore and stroke are 5 in. and 5½ in. respectively, and the normal rated horse power at a normal speed of 1,500 r.p.m. is 320 h.p. The maximum rated b.h.p. is 360 at 1,650 r.p.m. The petrol consumption is about 0·53 pts. per b.h.p. per hour, and the oil consumption 0·03 pints/h.p./hour. The weight of the engine is 710 lbs., and the compression ratio 5 to 1. The "Jaguar," as will be seen from the photographs, is very compact, its overall length being but 46½ in. and its maximum diameter (over cylinder heads) 45 in.

Honours

H.M. THE KING has granted unrestricted permission for the wearing of the following decoration, conferred by His Majesty the King of the Belgians on the following officer for valuable services rendered in connection with the War :—

Croix de Guerre avec Palme.
Squadron-Leader R. L. G. Marix, D.S.O.

R.A.F. Club Cricket Week

ARRANGEMENTS for the Royal Air Force Club Cricket Week are now nearing completion. By arrangement with the Eastbourne Club, the Saffrons Ground at Eastbourne has been secured for the dates September 20-26 inclusive and the football fixtures arranged for that time have been postponed.

Two three-day matches will be played. The first (on September 20, 21, 22) will be North of England *v.* South of England; the second (September 23, 25, 26) will probably be an eleven of Past R.A.F. Officers and Men *v.* the Rest of England, or a similar fixture.

The following ex-R.A.F. officers and men have accepted invitations to play: P. G. H. Fender (Surrey), Hon. F. S. G. Calthorpe (Warwick), A. H. H. Gilligan (Sussex), A. Jeacocke (Surrey), S. L. Amor (Somerset), Hobbs (Surrey), Woolley, F. E. (Kent), Hardinge (Kent), Geary (Leicester), Parker (Gloucester) and Waddington (Yorks).

Others who have accepted invitations to play include Hon. L. H. Tennyson (Hants), A. E. R. Gilligan (Sussex), A. W. Carr (Notts), N. Haig (Middlesex), Tyldesley, E. (Lancs), Kilner, R. (Yorks), Parkin (Lancs), Gunn, G. (Notts).

Although the week is not included in the list of first-class cricket fixtures, very excellent cricket should be seen, and the matches will have an added interest owing to the fact that several of the players may be selected for the South African tour and this may be the last occasion upon which the public will be able to see them before their departure.

Tickets for the reserved covered stand, and other information, may be obtained from the Hon. Secretary, Capt. M. G. Kiddy, 24, Denison House, 296, Vauxhall Bridge Road, S.W. 1. (Telephone, Victoria 2112.)

Aero Golfing Society

A NEW golfing club has been formed under the above title, with Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., as President.

A Committee (*pro. tem.*) has been appointed, including A. J. A. Wallace Barr, P. Barry, Comdr. W. Briggs, R.N., Lieut.-Col. W. A. Bristow, C. R. Fairey, E. B. Parker, Capt. L. V. Pearkes.

Lieut.-Col. F. K. McClean, A.F.C., is Hon. Treasurer and Mr. Harold E. Perrin, Hon. Secretary.

The Headquarters are at the Royal Aero Club, 3, Clifford Street, London, W. 1.

Membership (limited to 100) is open to officers and ex-officers of the R.N.A.S., R.F.C. and R.A.F., and to gentlemen engaged in the Aircraft Industry; the annual subscription is 10*s*.

British Forces in Ireland

THE Postmaster-General states that, in order to avoid the risk of delay to letters, parcels, etc., for the British military and Royal Air Forces in Dublin and district, the address should consist of—(1) The name and rank of the addressee; (2) his unit; and (3) the words, "Army Post Office, Southern Ireland."

THE LONDON AERO-MODELS ASSOCIATION
(The Society of Model Aeronautical Engineers.)

The postponed competition for FLIGHT Challenge Cup will be held on Saturday next on Wimbledon Common at 5 p.m. Members to meet at the Windmill at 4.30 p.m. For rules see FLIGHT, June 22. A rising-off sheet will be provided on account of the bad state of ground. The thanks of the members are due to Mr. F. de P. Green, Mr. Houlberg and Mr. Rippon, for having kindly undertaken to prepare same. Thanks are also due to Mr. Green and Mr. Evans for providing the Society with a set of flags and tapes.

The Competition for Mr. Felix Kelly's Challenge Cup will be held on Saturday, September 2. See FLIGHT, June 29, for full particulars of same.

Transfers of the letters L.A.M.A. can now be obtained from Mr. Burchell.

The Committee are desirous of active members putting up new flying records.

The membership of the Society is now approaching 80. Can we reach the first hundred before the end of September?

Meetings are held at Headquarters, 20, Great Windmill Street, Piccadilly, W. 1, every Thursday evening, at 7.30. Anyone interested in model aeronautics will be welcomed.

A. E. Jones, Hon. Sec., 48, Narcissus Road, West Hampstead, N.W. 6.

FLIGHT

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE AERIAL DERBY, 1922

(Under the Competition Rules of the Royal Aero Club and the Regulations of the Fédération Aéronautique Internationale)

at

Waddon Aerodrome, Croydon, on Monday, August 7, 1922.

Prizes

The following prizes will be presented by the Royal Aero Club :—

Fastest time (winner of the Aerial Derby), Trophy and £300 ; Handicap : 1st prize, Trophy and £150 ; 2nd prize, £75 ; 3rd prize, £50.

Regulations

Qualification of Competitors.—The Competition is open to persons of any nationality holding a licence issued by any Aero Club affiliated with the Fédération Aéronautique Internationale.

Organisation.—The Competition shall be conducted by the Royal Aero Club under the Competition Rules of the Royal Aero Club and the Regulations of the Fédération Aéronautique Internationale.

Entries.—The entry fee is £10. Entries close on Wednesday, July 26, 1922, at 12 noon. Late entries will be received up to 12 noon on Monday, July 31, 1922. Late entry fee £15.

Course.—The Course is approximately 200 miles, and will consist of a double circuit of London, starting from Waddon Aerodrome, Croydon, with the following turning points : West Thurrock, Epping, Hertford, Brooklands Aerodrome, Weybridge.

Air Navigation Regulations.—Competitors must comply with the Air Navigation Regulations in force.

Members of the Club will be admitted free on presentation of their Membership Cards. Motor-cars, 6*s*.

COMMITTEE MEETING

A meeting of the Committee was held on Wednesday, July 12, 1922, when there were present : Lieut.-Col. F. K. McClean, A.F.C. in the Chair ; Wing-Commander W. D. Beatty, C.B.E., R.A.F., Mr. Ernest C. Bucknall, Lieut.-Col. M. O'Gorman, C.B., Mr. T. O. M. Sopwith, and the Secretary.

F.A.I. Rome Conference.—The following delegates were appointed to represent the Club at the F.A.I. Conference to be held in Rome on October 4, 1922 :—

Lieut.-Col. F. K. McClean, A.F.C., Lieut.-Col. M. O'Gorman, C.B., H. E. Perrin.

Racing Committee.—The recommendations of the Racing Committee regarding the Aerial Derby were received, and it was decided to hold the Race at Croydon on August Bank Holiday, Monday, August 7, 1922.

Schneider Cup.—The entry on behalf of Great Britain was reported as follows :—

Flying Boat, constructed by the Supermarine Aviation Works, Ltd., with 450 h.p. Napier engine. Pilot, Captain H. C. Biard.

It was unanimously decided to vote £100 towards the expenses of the British competitor.

Aviators' Certificates.—The following Aviators' Certificates were granted :—

7927 Norman Jeffries, May 19, 1922.
7928. Frederick Arthur James Champion, May 11, 1918.
7929. Leslie Norman Hollinghurst, March 20, 1917.

Offices : THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN JULY 9 AND JULY 15, INCLUSIVE

Route‡	No. of flights*	No. of passengers	No. of flights carrying Mails	No. of flights carrying Goods	No. of journeys completed†	Average flying time	Fastest time made by	Type and (in brackets) Number of each type flying
						h m.		
Croydon–Paris	52	161	26	36	50	2 31	D.H. 34 G-EBBQ (1h. 56m.)	B. (6), D.H. 9 (1), D.H. 18 (1), D.H. 34 (3), G. (8), H.P. W.8B (3), V. (1).
Paris–Croydon	52	154	10	32	48	2 54	D.H. 34 G-EBBQ (2h. 6m.)	B. (7), D.H. 9 (1), D.H. 18 (2), D.H. 34 (3), G. (8), H.P. W.8B (3), V. (1).
Croydon–Brussels ...	10	17	6	9	10	2 25	D.H. 34 G-EBBR (2h. 1m.)	D.H. 18 (1), D.H. 34 (1), W. (1).
Brussels–Croydon ...	10	20	—	4	9	2 30	Westland G-EARE (2h. 8m.)	D.H. 18 (1), D.H. 34 (1), W. (1).
Croydon–Rotterdam–Amsterdam.	11	14	11	10	11	2 33§	Fokker H-NABH (2h. 4m.)	F. (8).
Amsterdam–Rotterdam–Croydon.	11	7	11	11	11	2 57§	Fokker H-NABN (2h. 15m.)	F. (8).
Totals for week ...	146	373	64	102	139			

* Not including " private " flights. † Including certain journeys when stops were made *en route*.
‡ Including certain diverted journeys. § Rotterdam.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. N. = Nieuport.
P. = Potez. R. = Rumpler. Sa. = Salmson. Sp. = Spad. V. = Vickers Vimy, Vulcan, etc. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc. :—Co. des Grandes Expresses Aériennes ; Daimler Hire, Ltd. ; Handley Page Transport, Ltd. ; Instone Air Line ; Koninklijkie Luchtvaart Maatschappij ; Messageries Aériennes ; Syndicat National pour l'Étude des Transports Aériens ; Co. Transaérienne.

Incidental Flying.—During the week two of the De Havilland Co.'s D.H. 9's kept up a daily service between Lympne and Ostend, carrying goods and passengers.

THE HANDASYDE MONOPLANE, TYPE H.2

Rolls-Royce "Eagle" Engine

ONE of the most interesting machines which we have had the opportunity of seeing is now nearing completion at the Bleriot Works at Addlestone. The machine referred to is the new Handasyde monoplane, designed by Mr. G. H. Handasyde, of the Handasyde Aircraft Company, for Australia. Being at the moment without works for manufacturing aircraft, the Handasyde Aircraft Co. have made arrangements with Mr. Chereau for the construction of a batch of these machines at the Bleriot Works, and here we had the opportunity of inspecting the machines last week for the purpose of compiling the following notes, and obtaining the accompanying illustrations. It should be pointed out that, at the time of our visit, no drawings were available of the engine cowling and undercarriage. Although as regards general lay-out the accompanying scale drawings are accurate, the portion relating to these two items should be taken as representing the general idea only, and is not guaranteed to be exact as regards dimensions, as we were unable to obtain certain necessary information relating to wheel track, size of wheels, etc. For the rest, however, the scale drawings on p. 413 may be taken as being accurate.

General Design

To those who have followed the development of flying since its earliest days it will not come as a surprise that the new H.A.C. machine is a monoplane. From the very first Mr. Handasyde was a great believer in the monoplane, and it will be remembered that his early machines, round about 1911, 12 and 13, were of this type. During the War Mr. Handasyde turned his attention to biplanes, not because he had lost his faith in the mono., but as a result of the demands of the R.A.F. He proved that he was quite as capable of designing biplanes as monoplanes, and probably his F.4 is the most beautiful aeroplane that has ever been produced. It must be admitted that, purely as regards appearance, the new monoplane is not up to the F.4, but probably this was impossible of attainment in a monoplane type.

The new machine, which is of the cantilever type, is characterised, in the matter of construction, by being built almost entirely of wood. Metal is used very sparingly in the construction, and the manner in which the wood has been used is everywhere interesting and, in places, highly ingenious.

The Fuselage

The *fuselage* is built up of a framework of four main *longerons*, a certain number of stringers, and shaped formers or bulkheads. The covering is three-ply wood. Although the main frame work is of rectangular section, the cross-section of the complete body is rounded, the flat sides, top and bottom having been brought up to a rounded section by curving the formers and bending the three-ply covering over them. It is an old axiom that one can bend three-ply sheet over a single but not over a double curvature. In other words, although it can be bent over a cylinder, it cannot be bent over a barrel. In the Handasyde H.2, as the new machine is called, it would appear that an attempt has been made to bend the three-ply covering over a barrel. On closer examination, however, one discovers that the old saying has not been disproved, since here and there it has only been possible to persuade the ply-wood to bend by sawing little vee-shaped pieces out of the ends. By using smaller panels elsewhere, the desired curvature is obtained, or, more correctly speaking, the curvature consists of several relatively small straight faces.

The four main *longerons* are of ash, while the simple struts and stringers are of spruce. The shaped bulkheads or formers are built up into box sections from ash flanges and three-ply walls. A noticeable feature of the *fuselage*, which, incidentally, has also characterised Handasyde-designed biplanes, is that all tapers are straight, with the *longerons* butt-jointed and the joints reinforced by fish-plates of generous area. Thus in the H.2 the cabin portion of the *fuselage* is one piece, with the *longerons* running parallel. To this portion the rear part of the *fuselage* is joined and runs in a straight taper to the tail. Similarly, the part of the *fuselage* which is in front of the cabin is of straight taper, with joints well secured by large fish-plates.

The Monoplane Wing

Perhaps the most interesting feature of the machine is the manner in which the wing has been built up. Aerodynamically also the wing is interesting, on account of the sections employed, which taper from a deep bi-convex section at the root to a very thin section, with perfectly flat bottom camber, at the tip. So far as we were able to discover, there is no change in the angle of incidence along the span: in other words, there is neither "wash-out" nor "wash-in."

Constructionally, the wing is interesting; first, on account of the fact that it is built up on four main spars, and, secondly, because of the unusual wooden covering which takes the place of fabric. From the plan view of the general arrangement drawings, it will be seen that the wing, which is built in two halves, joined on the centre line, has a pronounced taper from root to tip. The front main spars are parallel, the others tapering so as to fall always at the same percentage of the chord from the leading edge. The use of more than two spars in a cantilever wing has previously been advocated in this Journal as being more economical, but up to the present no machine except the new Handasyde has been built in this country which incorporates this feature.

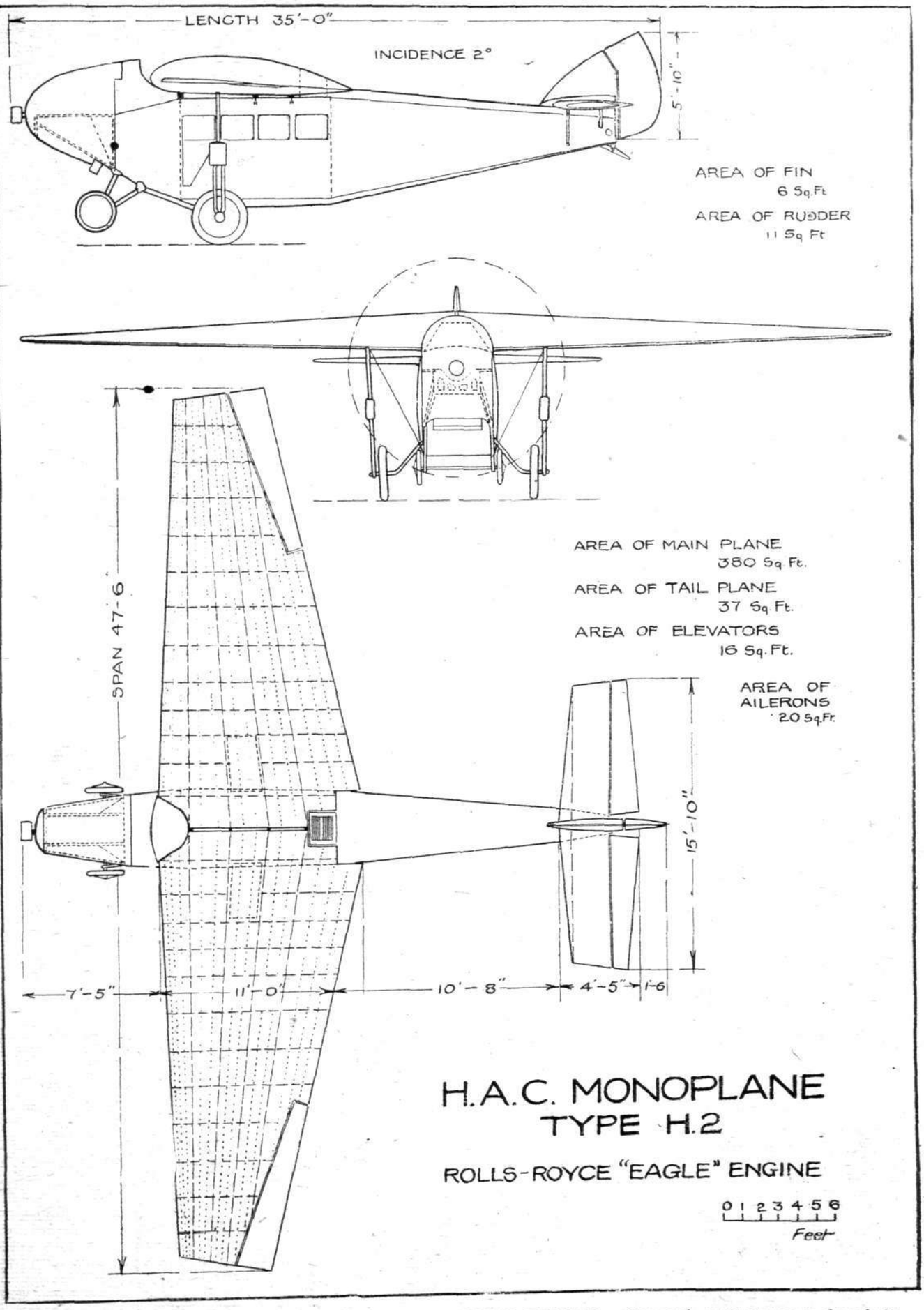
The construction, quite apart from the number of the spars, is interesting. Obviously with four spars each can be built much lighter and the usual forms, such as simple I sections or box sections may not necessarily be the best. The form which the spars of the H.2 take is a built-up I section, with a thin web of two-ply spruce and divided flanges of the same material. The web is built up of two thicknesses, each composed of thin strips about 4 inches wide crossing the other at right angles, each crossing the horizontal at 45 degrees. In order further to strengthen the web, its two sides are covered with fabric. The flanges, which are made up of two strips each, have their halves screwed and nailed through the web, which comes up to the level of the outer faces of the flanges.

Between the spars there are two sets of stringers, one set on the upper surface and one on the lower, and the ribs, which are of a construction somewhat similar to that of the spars, are notched to receive the stringers.

The ribs are built up of thin three-ply webs, stiffened with vertical and diagonal pieces of spruce, having two sets of flanges, one of which passes inside the stringers and the other forms the outer flanges. The sketches will serve to indicate the construction. All ribs project past the stringers and come up to the level of the wooden wing covering. Where local loads occur, such as, for instance, the petrol tanks, the attachment of the undercarriage struts, etc., double ribs are used, whose construction is also shown in the sketches. Both single and double ribs have the outer flanges running across the spars, and the shear stresses are taken by the inner flanges and three-ply webs resting against the inner faces of the spar flanges.

Interesting as is the construction of the spars and ribs, the wing covering is even more so. Although it appears possible that the wood covering takes a certain part in supporting the load, the manner of applying the strips of which it is composed is such that no allowance has been made for this in stressing the wing. The covering consists of spruce strips approximately $\frac{1}{8}$ inch thick and about 4 inches wide, laid parallel in a fore and aft direction. In order to lighten these strips, they have been spindled out, leaving narrow ridges the full depth of the thickness of the strips. It was noticed that where the strips are bent over a fairly steep curve, the spruce covering strips, or planking, as one might term them, had sagged between these ridges, much as does the fabric between ordinary wing ribs, but, of course, to a much smaller extent. There is no internal drag bracing, as the wing planking, running fore and aft, is capable of resisting drag stresses. The leading edge of the wing is formed by $\frac{1}{16}$ inch three-ply, packed up by strips on the front spar to come level with the thicker spruce covering. We have no figures relating to the weight of the wing, but Mr. Handasyde informs us that, although heavier per square foot than the ordinary thin wing with bracing, in view of the high lift coefficient of the thick section, the wing comes out quite light. Naturally the first wings have been very expensive to build, as jigs, etc., had to be erected, but it is thought that for production in quantities the construction will not be unduly expensive. The finished wing certainly looks a beautiful piece of work, and we think Mr. Chereau is to be congratulated upon the manner in which his works have carried out a difficult piece of construction.

The attachment of the wings to the *fuselage* is very neat and simple, and should prove very satisfactory. On the four formers in the cabin, near the top *longerons*, are metal fittings, roughly of T shape, with the one arm of the T projecting out through the *fuselage* covering. As there is



THE H.A.C. MONOPLANE, ROLLS-ROYCE "EAGLE" ENGINE: General arrangement drawings.

one of these plates on each side of the former, and bolted through it, two lugs project from each former. On the main wing spars are long straps, one on the front and one on the rear of each spar, projecting below the wing covering. These lugs are in line with, but slightly above, those on the *fuselage*, and the two are held together by a form of turnbuckle. In order to distribute the weight of the wing, when the machne is on the ground, over a larger area, the wing fittings have aluminium packing pieces, which engage with wooden brackets on top of the *fuselage*. The rearmost fitting on the *fuselage* has also an aluminium packing piece, stepped to locate the rear wing spar in a fore and aft direction. It might be mentioned that the wood brackets on the top of the *fuselage* are faced on top with leather, so as to allow of the wing fittings bedding right home in the leather.

Engine Mounting

The engine mounting is one of the simplest imaginable, the framework consisting of four *longerons* of ash about 2¼ inches square, bolted at the rear to the front end of the *longerons* with the usual large fish-plates, and terminating in front in two points, on a former of multi-ply wood. The engine bearers are simply two stout steel tubes resting in sockets in the bulkhead and in the front multi-ply former, and braced by a tube running to the lower corner on each side. It would be difficult to imagine a simpler mounting and one which allowed of easier access to the engine.

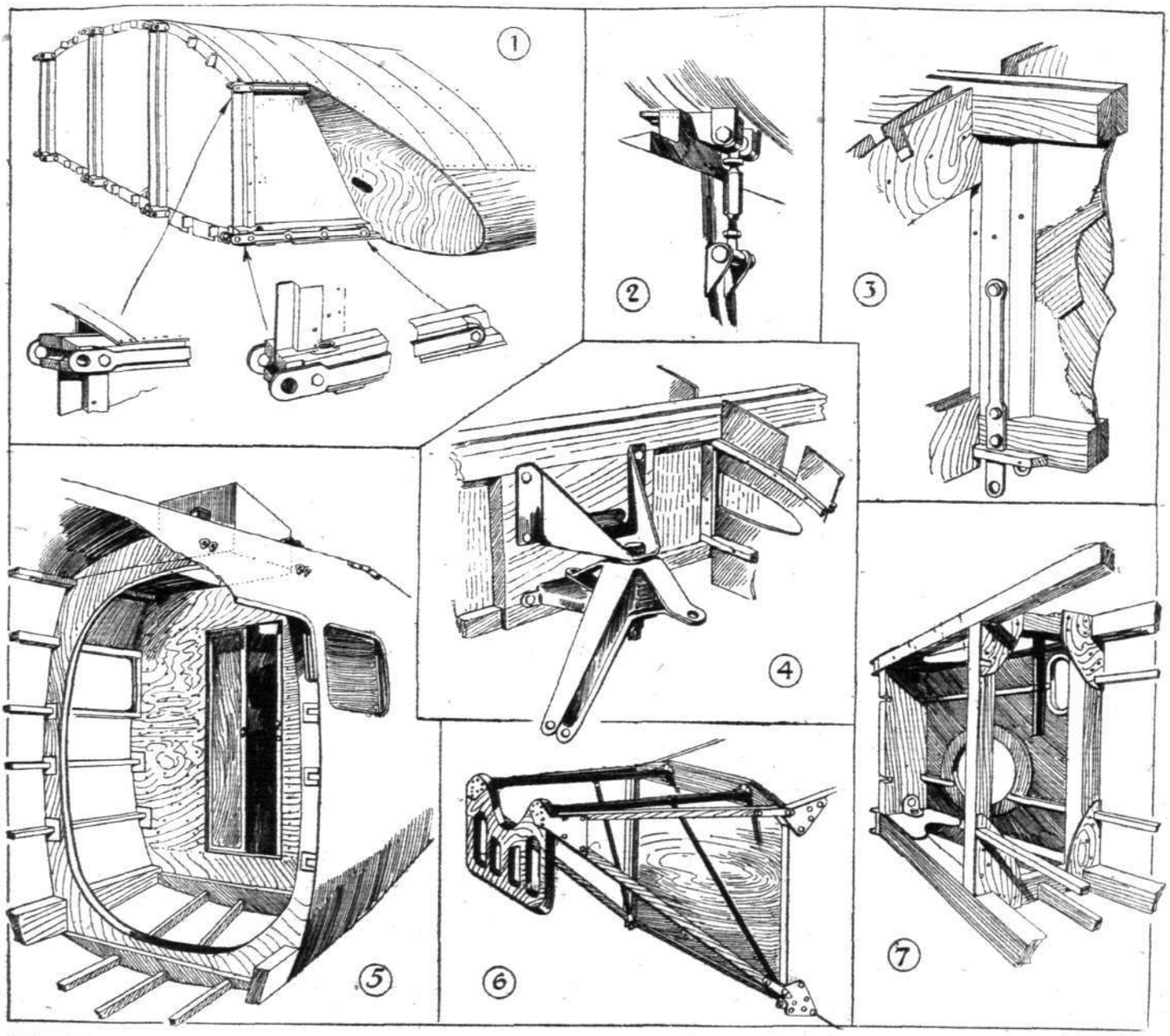
The radiator, which was not in place when we saw the machine, is to be mounted behind and below the engine, with a portion projecting below the lower cowl. Without a front radiator the nose of the engine housing can be nicely rounded off, somewhat as shown in the scale drawings.

Petrol System

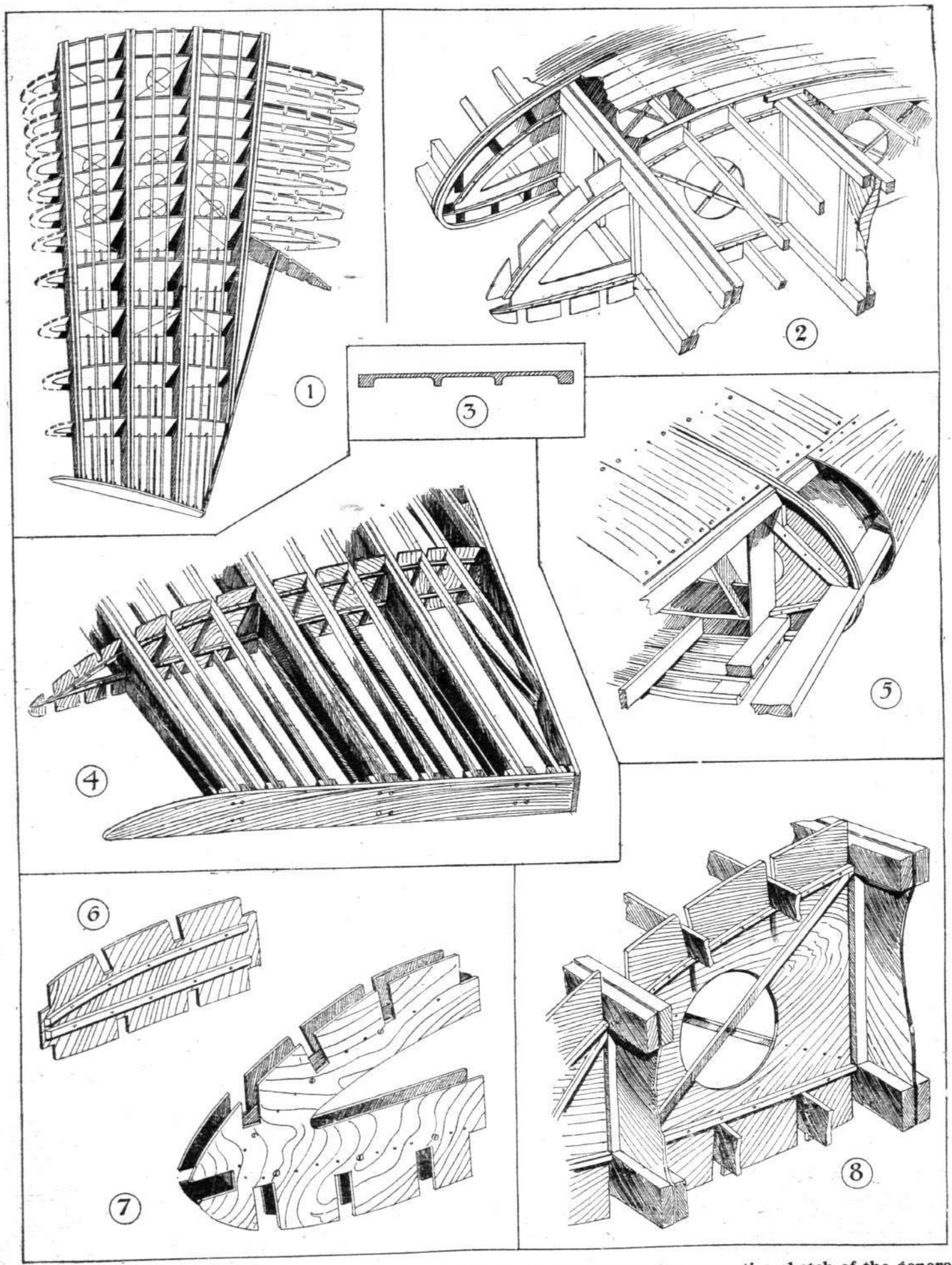
The petrol system of the H.A.C. H.2 is of the latest approved type, with the tanks in the wings, right outside the *fuselage*. Owing to the great depth of the wing section, it has been possible to place the tanks entirely inside the wings without unsightly projections. It appears doubtful, however, whether the "head" thus obtained will be sufficient for direct gravity feed, and probably a small service tank will have to be carried in the *fuselage*. A low-pressure petrol system should be sufficient, so that even if the ideal of direct gravity feed is not attained, there should be little possibility of trouble with the petrol supply.

The Undercarriage

One of the features of the machine about which we were not able to obtain very definite details is the undercarriage. It is understood that this is to be of the four-wheeled type, with two large wheels approximately under the centre of gravity, and with a smaller pair under the nose to prevent turning over. From the fittings on the *fuselage* it is assumed that the axle will hinge on the lower *longeron*, and run out a considerable distance, terminating in a slight bend just inside the wheel. The latter is to be sprung, how we do not yet know, by a telescopic strut to the wing. A very



SOME CONSTRUCTIONAL DETAILS OF THE H.A.C. MONOPLANE : 1. Rib at root of wing, with fittings for joining two halves together. Eight bolts, four on top and four underneath, secure the two wing halves. 2. The wing spars are secured to the fuselage hoops by a form of turnbuckles. 3. Steel strips running up the side of the wing spars transmit the load from the lift fittings. 4. A crank lever in the aileron system. 5. View into cabin portion of fuselage. Wall broken away to show details. 6. The engine mounting is of great simplicity, and allows free access to any part of the Rolls "Eagle." 7. The construction of the rear portion of the fuselage, in the vicinity of the tail trimming gear.



THE H.A.C. MONOPLANE : Some constructional details. 1. Diagrammatic perspective sketch of the general arrangement of the wing. 2. Details of spar and rib construction. 3. Section through a spruce strip used for the wing covering. 4. The raked rib of the wing tip. 5. Details of leading edge, which is covered with thin three-ply wood. 6. Piece of three-ply rib web, as fitted between spars. 7. Nose-piece of a double rib. 8. Larger view of method of building up spars and ribs.

substantial metal fitting on the wing receives the strut, and, in order to distribute the load over the spar, this fitting incorporates an aluminium packing piece of ample area, against which the telescopic strut abuts. In order to turn the bending stress into a purely compressive stress in the spar, a bracing cable or wire is taken to the fitting on the lower *longeron*, on which the axle hinges, and the *fuselage* is here reinforced by a tie rod running underneath the belly of the *fuselage* to the fitting on the other side. This tie rod is anchored in trunnions working in the fitting on the *fuselage*. To a certain extent the wire or cable running from the wing to the *fuselage* will help in bracing that particular wing spar against flying loads, although it will not, of course, help to any extent in resisting twisting stresses in the wing.

The front pair of wheels will presumably be carried on two small vees, judging from fittings on the *fuselage*.

The Tail

Of very characteristic outline, the tail plane, elevators, rudder and fin are of more orthodox construction than are the main planes. The tail plane, for which a very substantial worm trimming gear is provided, has spars of straight taper, spindled out to an I section. The vertical fin has a stout post fitting into brackets on the back of the stern post, and to it the rudder is hinged by eye-bolts. The fin curves over the top of the tail plane, and fin, rudder, tail plane, and elevators are of symmetrical streamline section.

Cabin Accommodation

The middle portion of the *fuselage* is devoted to cabin accommodation for the passengers. Normally, seats will be provided for six passengers in the cabin, but should it be desired to use the machine for goods carrying the space available is reasonably large, and even bulky goods could be carried, provided the packages were small enough to go through the doors. Of these there is one on each side, near the front of the cabin, and three windows on each side, aft of the doors, serve to admit the light.

An emergency exit through the roof of the cabin is provided. This takes the form of a box of three-ply wood, built on to the roof and projecting up inside a cut-out portion in the trailing edge of the wing. On top this exit is covered with a hinged trap door of sheet aluminium, provided with *louvres* for the ventilation of the cabin. Aft of the cabin is a lavatory, while in front, under the pilot's seat, is a space for luggage.

The Pilot's Cockpit

Placed as it is in front of the wing, and with the nose of the *fuselage* fairly pointed, the position of the pilot's cockpit should ensure a very good view forward, which is a point not always given due consideration by designers. In the H.2 the pilot is placed high, his head level with the leading edge of the wing, out of which a portion has been cut to accommodate him. The front portion of the cockpit is formed by a deep three-ply fairing built on to the top of the *fuselage* proper. The controls will be of more or less standard type, as will also the equipment of instruments, etc.

At present a batch of four machines is coming through the Bleriot Works, and it is understood that they are intended for the Larkin Company in Australia, for service on the Brisbane-Sydney-Adelaide route. The addition of such very up-to-date flying stock to these services should materially help towards establishing commercial aviation on a sound basis in Australia.

As regards weights, performance figures, etc., we have not at present been able to obtain any information, but there would appear to be every reason to think that, with its good wing sections and a well-shaped body, the new Handasyde monoplane will be fairly fast, especially as the fitting of a Rolls-Royce "Eagle" for but six passengers should result in a fairly large reserve of power. A little later, when the first machine has been tested, we hope to be able to supplement this description with further details and with figures of weights and performance.

London Gazette, July 11, 1922

General Duties Branch

Flying Offr. D. L. Evans, M.C., D.F.C., is granted a permanent commn., retaining his present substantive rank and seny.; Oct. 24, 1919. *Gazette*, Oct. 24, 1919, appointing him to a short service commn., is cancelled. Flight Lieut. A. W. Bird, D.S.O., resigns his permanent commn., and is granted the rank of Maj.; April 18. J. C. Jeffrey, M.C., is granted a short service commn. as a Flying Offr. for three years on the active list, with effect from, and with seny. of July 1. Flight Lieut. A. H. Wann is restored to full pay from half-pay; June 13 (substituted for *Gazette*, June 23). Flying Offr. G. E. Randall, D.F.C., to take rank and precedence as if his appt. bore date April 1, 1919. Reduction to take effect from July 1. Flying Offr. M. Pennycook is dismissed the Service by sentence of a General Court-Martial; July 4. Flying Offr. A. M. G. Cosgrave relinquishes his short service commn. on account of physical unfitness for full flying duties, and is permitted to retain rank of Lieut.; July 12. Flying Offr. F. A. Benfield is placed on retired list on account of ill-health contracted on active service; July 12.

Stores Branch

The following are granted short service commns. as Flying Offrs. for Accountant duties, with effect from dates indicated. Their names will be placed on the gradation list immediately below those of the officers indicated in brackets.—*Flying Offrs.*—R. E. Barrett; May 16 (R. G. Dyer). L. J. Marden; May 16 (A. B. Holt). F. W. Healey; May 19 (F. H. Wakeford).

Flying Offr. E. J. Stokoe relinquishes his short service commn. on account of ill-health; July 12.

Medical Branch

The following are granted permanent commns. in the ranks stated, with effect from the dates indicated, retaining their present seny., except where otherwise stated. *Gazettes* of dates indicated in brackets, appointing them to short service commns., are cancelled:—

Flight-Lieuts.—A. Briscoe, M.B., July 13, 1920; July 13, 1920. T. Montgomery, M.B., B.A., July 13, 1920; July 13, 1920. G. H. H. Maxwell, Aug. 24, 1920; Sept. 14, 1920. S. E. Elphick, April 4, 1921; April 12, 1921.

Flying Offr. (since promoted).—R. Boog-Watson, June 7, 1920; June 15, 1920.

The following Flight-Lieuts. are transferred to the Reserve Class D. 2 (July 13):—W. A. Malone, J. P. Wells, B.A., C. H. Young, M.B.

Memorandum

The permission granted to Sec. Lieut. W. Cougle to retain his rank is withdrawn on his joining the Army.

ROYAL AIR FORCE INTELLIGENCE

Wing-Commanders: I. T. Courtney, C.B.E., from C. and M. Party, Felixstowe (Coastal Area), to Headquarters, Coastal Area (Supernumerary). 13.7.22. Henry Ashbourne Treadgold, M.D., B.A., from Air Ministry (D.M.S.) to R.A.F. Depot (Inland Area) (Supernumerary). 30.6.22. C. F. Kilner, D.S.O., from Boys' Wing (Cranwell) to H.M.S. *Argus* (Coastal Area), to command R.A.F. Unit. 15.8.22. G. P. Grenfell, D.S.O., from Instrument Design Establishment (Inland Area) to No. 1 Flying Training School (Inland Area) (Supernumerary). 17.7.22. R. J. F. Barton, O.B.E., from R.A.F. Depot (Inland Area) to command Boys' Wing (Cranwell). 1.8.22.

Squadron-Leaders: C. P. Ogden, O.B.E., from Marine and Armament Experimental Establishment (Coastal Area) to R.A.F. Depot (Inland Area) (Supernumerary). 15.7.22. D. S. K. Crosbie, O.B.E., from Air Ministry (D.O.I.) to R.A.F. Depot (Inland Area) (Supernumerary). 19.7.22. E. W. Craig M.C., M.B., from R.A.F. Depot (Inland Area) to Air Ministry (D.M.S.). 30.6.22. J. Scwrey, A.F.C., from R.A.F. Depot (Inland Area) to R.A.F. Cadet College (Ground Wing) (Cranwell). 1.8.22. F. W. Stent, M.C., from R.A.F. Depot (Inland Area) to M.T. Repair Depot (Inland Area). 1.8.22. R. E. Bell, M.B. (Medical), to Half-pay List. 30.7.22.

Flight-Lieutenants: N. R. Fuller. The notifications which appeared wherein this Officer was posted from R.A.F. Depot to No. 1 Flying Training School, with effect from 1.7.22, is hereby cancelled. Hon. J. H. B. Rodney, M.C., from Central Flying School (Inland Area) to No. 24 Squadron (Inland Area). 1.7.22. R. F. Durrant, A.F.C., from No. 10 Group Headquarters (Coastal Area) to School of Naval Co-operation and Aerial Navigation (Coastal Area). 18.7.22. E. F. Turner, from R.A.F. Depot (Inland Area) to No. 10 Group Headquarters (Coastal Area). 13.7.22. H. M. K. Brown, from 39 Squadron (Inland Area) to School of Technical Training (Men) (Inland Area). 10.7.22. C. E. Wardle, from No. 24 Squadron (Inland Area) to School of Technical Training (Men) (Inland Area). 6.7.22. E. R. Pretyman, A.F.C., from No. 56 Squadron (Middle East) to No. 25 Squadron (Inland Area) (Supernumerary). 4.7.22. R. H. Smyth, M.C., from No. 1 Stores Depot to No. 1 Flying Training School (Inland Area). 1.7.22. J. Roberts, from R.A.F. Depot (Inland Area) to M.T. Repair Depot (Inland Area). 10.7.22. W. L. Fenwick, from No. 2 Squadron, No. 12 Wing (Ireland), to No. 24 Squadron (Inland Area) (Supernumerary). 17.7.22. H. A. Tweedie, O.B.E., A.F.C., from R.A.F. Depot (Inland Area) to Air Ministry (D.O.I.). 19.7.22. T. C. Luke, M.C., from Inspector of Recruiting (Coastal Area) to R.A.F. Depot (Inland Area) (Supernumerary). 14.7.22. D. Mitchell, from Egyptian Group Headquarters (Middle East) to No. 4 Flying Training School (Middle East). 26.6.22. W. C. Green, M.C., from No. 4 Flying Training School (Middle East) to Stores Depot, Egypt (Middle East). 26.6.22. J. F. Lawson, A.F.C., from No. 5 Flying Training School (Inland Area) to Record Office (Inland Area). 1.8.22. E. J. P. Burling, D.S.O., D.F.C., from No. 230 Squadron, Felixstowe (Coastal Area), to School of Naval Co-operation and Aerial Navigation (No. 230 Squadron) (Coastal Area). 10.7.22. E. E. Isaac, M.C., to Research Laboratory and Medical Officers' School of Instruction (Coastal Area), on appointment to Temporary Commission. 3.7.22. W. D. Miller, M.B., from Marine and Armament Experimental Establishment to R.A.F. Depot (Inland Area) (Supernumerary). 12.7.22. O. St. Leger Campion, from R.A.F. Central Hospital (Coastal Area) to No. 2 Squadron, No. 12 Wing (Ireland). 10.7.22. T. R. S. Thompson, M.B., from No. 56 Squadron (Middle East) to Stores Depot, Egypt (Middle East). 10.6.22. T. J. Thomas, M.B., from No. 4 Flying Training School (Middle East) to Engine Repair Depot (Middle East). 2.6.22.

FLIGHT

LONDON TERMINAL AERODROME

Monday evening, July 17, 1922.

THE weather is as persistently against aviation this year as it was in favour of it last year, and during the week there has been a mixture of good, bad, and indifferent flying weather. The morning newspaper services to Paris, Brussels, and Holland have been held up some mornings in the latter part of the week, and pilots have had some pretty rough trips at times. Generally speaking, however, the persistent bad weather is not interfering now to any great extent with the regularity of the services. Competition is becoming so keen that flights are being made in weather which, a month or two ago, would have been considered unfit. In fact the spirit of the early days of the air services, when it had to be very bad weather indeed to stop flying, is slowly returning.

The number of air travellers still shows a slight increase, and it is now hoped that in August and September the expected "boom" in passengers may to some extent be realised, and that there will be enough traffic to keep all lines reasonably busy. The French lines still continue to carry the bulk of the goods traffic to Paris, while an overwhelming majority of the passengers travel by the British lines.

The Instone Air Line have now got the Vickers Vimy "City of London" back from the Vickers works at Weybridge, where she has been fitted with a new set of wings. It is claimed that these give greater lift, as well as bigger speed in the air and lower landing speed. The "Vimy" has been on the service during the week, but owing to engine trouble had to land twice on a return journey from Paris.

Entrants for the Round-Britain Race

THE Surrey Flying Services have been having a busy time lately. They have been erecting another Avro to add to their joy-ride fleet, and, with this completed, have now started on the erection of a D.H. 9. This machine is, I understand, being built to the order of the Duke of Sutherland, President of the Navy League, and is to be entered by him in the round-Britain race for the King's Cup, which is at present fixed for September 9 and 10. The machine is, so far as is at present arranged, to be flown in the race by Capt. A. F. Muir. Another Croydon entrant for this race, by the way, is Mr. Courtney, who is to fly a Siddeley "Siskin" with a Jaguar engine.

Capt. Muir informs me that owing to the success which attended the reduction in the price of joy-rides to 5*s*., on the occasion of the Royal Meteorological Society meeting at Croydon, the Surrey Flying Services have decided to try the experiment of reducing the fare to 5*s*. during the week-end, when there is a crowd at the air-station, and when the weather is suitable for dealing rapidly with numbers of joy-riders. This scheme was started on Saturday last, and, although the weather was not exactly of the type to encourage joy-riding, a good number of passengers were carried in two Avros by Capt. Muir and Mr. Youell. In addition, Capt. Muir has been making flights for the testing of parachutes during the week.

Turn Indicators for "Air Expresses"

THE D.H. 34's, both on the Daimler and Instone lines, are now being fitted with Reid turn-indicators, and the pilots are extremely pleased with the sensitiveness and efficiency of these instruments. In one test, made at dusk on Friday in misty weather, the pilot put his head down inside the cockpit so that it was impossible for him to see the ground and, using the indicating lights of the turn-indicator to guide him, kept the machine flying straight for mile after mile without the slightest difficulty.

Handley Page Transport are now running their services exclusively with W. 8's, keeping an o-400 in reserve. The D.H. 18 they were running has been taken over by the Instone Air Line, and the Bristol ten-seater is being reconditioned at Bristol, after which, I understand, the Instone Air Line will also take over this machine. Their fleet will be even more mixed than at present, as they will have D.H. 34's, D.H. 18's, one D.H. 4, one Vickers "Vimy" and a Westland or two; while they are expecting the return of the Vickers "Vulcan," together with one or two more of the same type, which, with the Bristol, will give them no less than seven different types of machine. It is certainly a striking contrast in policy to the other two British firms, who are confining themselves to one type of machine.

Mileage of the Aerial Cabin-Boy

DURING the week the first air cabin-boy completed his first 20,000 miles flying in the Daimler D.H. 34's. He has made over 90 trips between London and Paris and is becoming quite a seasoned air traveller. It is interesting to note also that the D.H. 34 G-EBBS has, under the Daimler management, now completed something like 50,000 miles of flying in a period of three months.

The entrance to the aerodrome has now been further ornamented by the addition of a number of sign-boards giving the number of the buildings and the names of the firms occupying them, the Post Office having a special sign-board all to itself. The different styles and sizes of the letters used have caused no little comment amongst those firms whose names are "writ small."

The K.L.M. still continue to "get the goods," and on several occasions recently have had to duplicate their services, being unable to carry the number of passengers wishing to travel, in addition to the regular consignments of goods. One firm of hat manufacturers in Holland are consigning their entire output of hats for the English market per K.L.M., and it is no unusual sight to see anything up to 30 parcels of hats unloaded from an incoming monoplane.

IN PARLIAMENT

All-Metal Aeroplane

SIR W. JOYNSON-HICKS, on July 10, asked the Secretary of State for Air whether his attention has been called to the statements in reference to the mode in which the Air Ministry has dealt with Messrs. Short Brothers' all-metal aeroplane; whether the said 'plane has been tested by pilots in the Air Force; what is their opinion upon it; whether any machines have been ordered; and, generally, what is the view of the Ministry in regard to this machine?

Captain Guest: My attention has been called to the statements which have appeared in the Press and to which I assume my hon. friend refers. The history of this case is as follows: This aeroplane was built and exhibited at Olympia by the firm in 1920. It was not designed to meet any particular Service requirement. Nevertheless, with a view to the encouragement of originality and enterprise, it was immediately purchased by the Air Ministry, and, as the structure incorporated certain novelties, the use, in particular, of a certain alloy of aluminium, the aeroplane was in 1921 sent to the Royal Aircraft Establishment to test the suitability of this material to withstand corrosion and vibration. In this connection, the problem of corrosion (tests of which must necessarily take a considerable time) is one of the greatest importance, and is, at the present time, being investigated by a special Sub-Committee of the Department of Scientific and Industrial Research. Pending a Report of this Sub-Committee, and until a satisfactory solution of the problem has been arrived at, it is clearly most undesirable to place a large order for these aeroplanes. It is, therefore, not intended to order any more at present. In answer to the second and third parts of the question, owing to the doubt as to the strength and reliability of the material used, it was not considered desirable to put this aeroplane through full air tests, but permission was granted to a pilot of the Experimental Section to fly it without load and without unnecessary manœuvres. As a result of these modified tests, a favourable report on the behaviour of the aeroplane in the air was received.

Sir W. Joynson-Hicks: Do I gather that they have been testing the metal of this machine for nearly eighteen months?

Captain Guest: Yes. I think it is apparent that the process of testing for corrosion must take a considerable time for us to satisfy ourselves.

Viscount Curzon: Pending the Report of the Sub-Committee, will Messrs. Short be allowed to construct any further machines to the same drawings?

Captain Guest: No. No further orders can be given until the test is completed.

Viscount Curzon: Will they be allowed to make further machines on their own account, and without Government orders for them?

Captain Guest: I think it would be inadvisable for the Government to do so.

Sir W. Joynson-Hicks: Can any date be given for the completion of the test?

Captain Guest: The moment the Industrial and Scientific Research Sub-Committee have reported, we shall get on with the business or close it down.

Territorial Air Force.

LIEUT.-COL. POWNALL asked whether it is intended to recruit a Territorial Air Force service; if so, whether the Territorial associations will be made use of in this connection; and what grants will be made to them for the expenditure which this extra duty will involve?

Captain Guest: The answer to the first question is that it is the intention to form an Auxiliary (or Territorial) Air Force, but the date at which it will be possible to introduce the Bill, which is already drafted, is at present doubtful; it has not been decided whether it will be proceeded with this year, as the whole policy of Home Defence is still under the consideration of the C.I.D.; to the second, in the affirmative; to the third, that the scheme will provide for grants being made to the county associations concerned, proportionate to their responsibilities and services.

Air Defence Brigades

CAPTAIN VISCOUNT CURZON on July 11 asked the Secretary of State for War whether an anti-aircraft brigade for the defence of London is to be formed in the Territorial Army; if so, what is to be the strength of the force and what will it cost; whether the War Office have any figures to show how large an anti-aircraft force would actually be required to defend London from attack by an air force as large as that of France; and whether the decision can be reconsidered, with a view to devoting the money to aircraft in lieu of ground defence?

Sir L. Worthington-Evans: As the answer to this question is somewhat lengthy, I will, with my hon. and gallant friend's permission, circulate it in the Official Report.

Viscount Curzon: Could I not have an answer to the last part of my question, as to whether the decision can be reconsidered with a view to devoting the money to aircraft in lieu of ground defence?

Sir L. Worthington-Evans: I think my Noble Friend had better see the entire answer. If the House likes, I can read it, but it is very long.

Following is the answer:

As a beginning to the future organisation for the air defence of Great Britain, two air defence brigades, Territorial Army, for the defence of London

are included in the current year's Estimates, and steps are now being taken to form them. This has been done in consultation with the Air Ministry.

The provisional peace establishment for the ground troops of an air defence brigade, Territorial Army, is approximately 1,633 all ranks, including the signal section. These numbers do not include the squadron or squadrons, Royal Air Force, co-operating with the ground troops. The total strength of two brigades as above is, therefore, approximately 3,266 all ranks. The above establishment has been agreed to by the Air Ministry, who were consulted.

The total annual cost of an air defence brigade, Territorial Army, as given above—exclusive of the squadron Royal Air Force—is about £55,000, and for two brigades it will therefore be £110,000.

The decision to raise the ground troops of two air defence brigades for the defence of Great Britain has been reached after careful study of present and future strategical conditions. It is not in the public interest to disclose the considerations which have animated the War Office in deciding to raise these ground troops. The due apportionment of the available money for defence against air attack between aircraft and ground defence troops has been, and still is, the subject of careful consideration.

Naval Aircraft.

VISCOUNT CURZON, on July 12, asked the Parliamentary Secretary to the Admiralty how many aeroplanes, pilots, and observers are now available for working with the Royal Navy for reconnaisance, fighting, torpedo carrying, bomb dropping, and observation, respectively; and how many are actually required to bring all aircraft carriers and ships fitted with flying platforms up to full establishment?

Mr. Amery: The aircraft (apart from reserves) allotted for working with the Fleet from ships and carriers are as follows:—

18 reconnaissance planes.
6 fighters.
12 torpedo planes.
18 spotting planes.

The personnel available is sufficient to man these aircraft. It is not in the public interest to give the information asked for in the second part of the question.

Viscount Curzon: Does the right hon. gentleman think the Navy is sufficiently prepared for war in the air with only 12 torpedo planes allotted to it?

Vice-Admiral Sir R. Hall: Are the personnel of the naval wing trained at sea or on shore?

Mr. Amery: I must ask for notice of that question.

Lieut.-Commander Kenworthy: Has the practice of fitting every light cruiser with one fighter been departed from, or are they still able to carry them and the machines are available?

Mr. Amery: I gave information the other day of the number of ships which are fitted to carry aeroplanes.

Viscount Curzon: Do the Admiralty really consider that these six fighting planes are sufficient for the requirements of the Fleet?

London to India Air Service

MR. L'ESTRANGE MALONE asked the Secretary of State for Air (1) whether the Civil Aviation Advisory Committee has yet considered the question of a London to India service with heavier-than-air craft; when this Report will be published; and whether he will take steps to see that this Report is available to Members of this House before the Burney airship scheme to India is approved or submitted to this House;

(2) whether his Department has considered the Burney airship scheme; what recommendations have they made thereon; whether the Air Ministry is aware that a London to India service with aeroplanes could be put into operation with more certainty, in a shorter time, with less capital expenditure, and smaller Government guarantees; whether any air transport firms have submitted projects of this nature; and whether he can give an assurance that schemes of this nature operating with heavier-than-air craft will receive as favourable consideration as the Burney airship scheme?

Captain Guest: With regard to the first question, the question of the practicability of an Imperial Mail Service to India, operated by heavier-than-air craft, has been, and still is, under consideration by the Civil Aviation Advisory Board, and I am expecting to receive their report at an early date. I intend to publish the report as a White Paper, and I hope to be able to issue it before the House rises. As regards the second question, the Burney Airship Scheme has received the full consideration of the Air Ministry. As I stated in my reply to the hon. Member on May 18, the Ministry considered that from a technical point of view the scheme was a notable advance on previous proposals of this kind, and that it offered a reasonable prospect of satisfactory operation between India and this country. Commander Burney's proposals were then referred to the Committee of Imperial Defence for consideration. As the Committee have not yet given their decision, I do not think it would be proper for me to make any further statement on the matter at present. In answer to the third part of the question I would prefer to await the publication of the Report of the Civil Aviation Advisory Board before attempting to compare the relative advantages of these two aerial transport schemes. The answer to the fourth part of the question is in the negative; to the fifth, in the affirmative.

Aircraft and Engines

VISCOUNT CURZON asked how many firms are at present engaged, either wholly or partly, in the construction of aircraft and engines; how many of these have intimated that they will have to close down unless some work can be given to them; and whether he can state what limitations or conditions, if any, are imposed by his Department upon firms engaged upon the construction of aircraft and engines for the Royal Air Force when tested, accepted, or rejected, respectively?

Captain Guest: The answer to the first question is that eighteen firms are engaged in the construction of aircraft; as regards engines, four major firms are engaged in the construction of engines, whilst four other firms are engaged to a lesser degree; to the second, that, for the reasons stated in my reply to my noble and gallant friend on the 6th instant, general representations have been made that the firms referred to may have to close down the departments devoted to such construction unless they receive orders sufficient to keep their staffs employed. In reply to the last part of the question, I am not clear what limitations or conditions my noble and gallant friend has in mind, but I shall be pleased to send him copies of the conditions of contract applicable to aircraft and engines ordered by the Air Ministry, if he so desires.

Viscount Curzon: Do I understand the right hon. gentleman to say that general representations have been made? Does that mean from the entire industry, practically?

Captain Guest: From deputations representing the industry.

Lieut.-Commander Kenworthy: What action is the Air Ministry or the Government taking on those representations? Do they realise the seriousness of this question? Is anything being done?

Captain Guest: The Ministry is fully aware of the seriousness of the position. If they have not the money they cannot give the orders.

Lieut.-Commander Kenworthy: Is this being represented to the Cabinet? If not, my right hon. friend ought to be in the Cabinet.

(Other Parliamentary questions unavoidably held over.)

IMPORTS AND EXPORTS, 1921-1922

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; for 1920, see "FLIGHT" for January 13, 1921; and for 1921, see "FLIGHT" for January 19, 1922.

	Imports		Exports		Re-Exportation	
	1921.	1922.	1921.	1922.	1921.	1922.
	£	£	£	£	£	£
Jan. ...	4,459	1,152	87,128	76,552	2,285	23
Feb. ...	2,379	567	59,829	69,129	19	1,100
Mar. ...	14	1,471	118,199	166,607	1,565	100
April...	1,370	3,846	138,983	139,995	450	5,880
May ...	3,350	2,416	59,624	167,999	1,818	4,254
June ...	5,181	816	79,713	129,137	—	14,530
	16,753	10,268	543,476	749,419	6,137	25,887

PUBLICATIONS RECEIVED

I.C.A.R. International Concours Aviatique Rotterdam, 2-17 Sept., 1922. Royal Aero Club of the Netherlands, The Hague, Holland.

Reports and Memoranda, Aeronautical Research Committee:—

No. 586.—(1) *Report on Various Airscrews designed for S.E.* 5. By the Aerodynamics Staff of the R.A.E. (2) *Report of some Experiments with Model of the S.E.* 5 *and Models of these Airscrews.* By the Aerodynamics Staff of the N.P.L. July, 1921. Price 3*s.* net; by post, 3*s.* 2½*d.*

No. 689. *The Canonical Forms of the Equations of Motion of an Aeroplane in Still and Gusty Air.* By Prof. G. H. Bryan, F.R.S. February, 1921. Price 9*d.* net, by post 10½*d.*

No. 692. *Notes on French and Italian Aeronautical Practice with Particular Regard to Airships.* By J. R. Pannell, A.M.I.M.E. Price 2*s.* 6*d.* net. By post 2*s.* 7½*d.* London: H.M. Stationery Office, Kingsway, W.C. 2.

No. 744 (*Ae.* 11). *Theory of Initial Motions and Its Application to the Aeroplane; being a Sequel to R. and M.* 689. By G. H. Bryan, Sc.D. July, 1921. Price 9*d.* net; by post 10*d.*

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: **cyl. = cylinder; I.C. = internal combustion; m. = motors**
The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1921

Published July 13, 1922

1,222. J. W. RAPP. Airplane ribs. (157,310.)
1,664. ZEPPELIN-WERK LINDAU Ges. Hollow body of sheet metal with rib-like stiffenings, for use as hulls and wings. (157,953.)
7,205. SOC. DES MOTEURS SALMSON (SYSTÈME CANTON UNNE). Magnetos. (161,162.)
7,240. ZEPPELIN-WERK LINDAU GES. and C. DORNIER. Metal covering for aircraft, suitable for planes. (162,271.)
17,714. J. KELLY. Helmet for aviators, etc. (181,617.)

APPLIED FOR IN 1921

Published July 20, 1922

8,650. H. S. WILDEBLOOD. Wings. (181,828.)
18,874. G. HRIB. Means for supporting and driving an auxiliary overhead aeroplane propeller. (181,997.)

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